

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A plasma processor, comprising:

a processing vessel having a holder holding a substrate to be processed;

a microwave antenna provided on the processing vessel so as to oppose the substrate to be processed; ~~and~~

a processing gas supply part provided between the substrate to be processed on the holder and the microwave antenna so as to oppose the substrate to be processed,

the process gas supply part including a plurality of first openings through which plasma formed in the processing vessel passes, a process gas channel connectable to a process gas source, a plurality of second openings communicating with the process gas channel, and a cooling medium channel through which a cooling medium cooling the process gas supply part flows, wherein the cooling medium includes a cooling gas and mist; and

a cooling medium mixer to ~~mix the cooling gas and mist into the cooling medium~~ generate and supply the cooling medium to the cooling medium channel of the process gas supply part, the cooling medium mixer including

a mist source to generate the mist by atomizing supplied H<sub>2</sub>O using an ultrasonic wave; and

a mixing part to mix the cooling gas and the mist into the cooling medium.

2. (Previously Presented) The plasma processor as claimed in claim 1, wherein the cooling medium includes SF<sub>6</sub>.

3. (Currently Amended) A plasma processor, comprising:

a processing vessel having a holder holding a substrate to be processed;

a microwave antenna provided on the processing vessel so as to oppose the substrate to be processed; and

a processing gas supply part provided between the substrate to be processed on the holder and the microwave antenna so as to oppose the substrate to be processed,

the process gas supply part including a plurality of first openings through which plasma formed in the processing vessel passes, a process gas channel connectable to a process gas source, a plurality of second openings communicating with the process gas channel, and a cooling medium channel through which a cooling medium cooling the process gas supply part flows, the processing gas supply part attached to the processing vessel through a heat insulating part; and

a cooling medium circulator connected to the cooling medium channel and configured to circulate the cooling medium, the cooling medium circulator including a compressor configured to compress the cooling medium and a reserve tank that retains the compressed cooling medium.

4. (Previously Presented) The plasma processor as claimed in claim 3, wherein the cooling medium circulator has cooling means for cooling the cooling medium.

5. (Previously Presented) The plasma processor as claimed in claim 3, wherein the cooling medium circulator has cooling medium control means for controlling an amount of cooling of the process gas supply part by the cooling medium based on temperature measured by temperature measurement means provided in the process gas supply part.

6. (Previously Presented) The plasma processor as claimed in claim 5, wherein the cooling medium control means is flow rate control means for controlling flow rate of the cooling medium.

7. (Previously Presented) The plasma processor as claimed in claim 5, wherein the cooling medium control means is pressure control means for controlling pressure of the cooling medium.

8. (Previously Presented) The plasma processor as claimed in claim 7, wherein the pressure of the cooling medium channel is set to 0.2-1 MPa.

9. (Previously Presented) The plasma processor as claimed in claim 3, wherein the cooling medium includes a cooling gas and mist.

10. (Previously Presented) The plasma processor as claimed in claim 3, wherein the cooling medium includes SF<sub>6</sub>.

11. (Cancelled)

12. (New) The plasma processor as claimed in claim 1, wherein the processing gas supply part is attached to the processing vessel through a heat insulating part.

13. (New) The plasma processor as claimed in claim 12, wherein the heat insulating part includes two components and the two components increase a thermal resistance between the processing vessel and the process gas supply part.

14. (New) The plasma processor as claimed in claim 3, wherein the heat insulating part includes two components and the two components increase a thermal resistance between the processing vessel and the process gas supply part.